



## LP-Gas Basic Filling Procedures

### General Information



**Warning: Dispensing station to be operated only by a person who is certified according to Utah State Fire Prevention and Safety Law Title 53 Chapter 7 Part 3 Liquefied Petroleum Gas Act.**

**The State Fire Marshals Office is not to be considered a source of training in the dispensing of propane. The following information is given as a reference to the dispenser certification test only.** Training shall be provided by the LP-Gas Supplier and/or Management. **NFPA 58** requires that *“persons who transfer liquid LP-Gas shall be trained in proper handling and operating procedures.”*

### Standard Precautions

- All weeds, grass, brush, trash, and any other combustible materials shall be kept not less than **10 ft.** from the propane tank or point of transfer.
- Smoking, open flames, metal cutting or welding, portable electrical tools, extension lights, or any other source of ignition shall not be permitted within **25 ft.** of the point of transfer during operation.
- Dispensing employee *must* stay in attendance at the tank, cylinder, or vehicle during the entire filling procedure *until equipment is turned off and all valves are closed plugged and or capped.*
- *Self dispensing by the general public is strictly prohibited.*
- Propane is a liquid which boils at **-44 Degrees Fahrenheit** to produce vapor or gas. Personal Protective Equipment (**PPE**) is *required* by **OSHA** when transferring liquid propane. Propane resistant gloves and eye protection shall be worn to prevent freezer burns from contact with liquid propane.
- Prior to filling ensure the valve is straight and undamaged. Look inside the valve opening for any obstructions such as dirt, sand, ice, insects, etc. remove any such obstructions prior to filling. Inspect the threads if they are worn or damaged reject the container. If the valve is defective it may be replaced by a certified LP-Gas supplier.
- Leaks on filling connectors are *not* permitted. If a connector is leaking stop filling, tighten the fitting, then continue the filling procedure.
- When filling Recreational Vehicles: **prior to filling ensure engine is turned off, close the service valve, all pilot lights are turned off, and all persons must exit the vehicle.** All of these things must be accomplished before filling operations begin.
- All vehicles within **15 ft.** of transfer operation must have the engine turned off, as well as ensure there is no smoking within **25 ft.** of the operation.



- LP-Gas pressure increases with temperature. To allow for expansion, propane containers are to be **filled only to 80%** of their capacity. **Never overfill cylinders.** Never round up the meter after the cylinder is full, this will overfill the container. It is unlawful for a customer to ask to or overfill a container.
- Fill cylinders by using the ***fixed liquid level gauge***. If a fixed liquid level gauge is not installed in the container, the container must be filled by weight (contact LP supplier for instructions and equipment). Never use a float or empty/full type gauge during the filling procedure.
- Immediately stop filling when ***white mist or fog*** (liquid) starts to spray out of the fixed liquid level gauge. Shut off the hose end, close the service valve, and disconnect the connector. After filling apply soap solution or approved leak detector to test for leaks.
- To prevent an accidental leak and prior to transportation; valve outlets on all DOT & ICC cylinders with a capacity of 50 lbs. or more without an OPD valve require a **POL Plug or protective cap** (many screw onto the cylinder itself, make sure this is firmly secured before transporting). ***OPD valves do not require a plug as this may open the seal on the valve and cause a leak. Instead use a cap or dust cover.***
- ***Cylinders shall be transported in the upright position*** unless otherwise indicated on the cylinder by arrows or other marking. (Horizontal cylinders)
- In its natural state LPG is colorless and odorless. To increase the likelihood of detection, ***ethyl-mercaptan***, a sulfur-based compound is added to the gas at the time of production. This gives the Liquefied Petroleum Gas a *rotten egg smell*.
- If the *ethyl-mercaptan* (rotten egg) smell is detected prior to filling, care should be taken to check for possible leaks in the cylinder, dispensing hose, piping, valves, and tank. If a leak is detected ***the LP distributor shall be contacted to have it repaired before dispensing.***
- **Purging:** to get rid of something undesirable, impure, or imperfect. ***Purging*** is required to remove air, methanol, and water from the cylinder. All new and repaired cylinders must be purged prior to filling and placing in service.
- All propane cylinders are equipped with at least one spring-loaded ***pressure relief valve***, designed to open when pressures inside the contained reach the pressure setting. Overfilling and high temperatures may cause this valve to open. Once the container has reached the proper pressure the valve will close. If propane is released into the air it quickly vaporizes, ***expanding at 270 times*** its original volume. Meaning ***1 gallon*** of liquid released = ***270 gallons*** of vapor which in turn makes over ***10,000 gallons*** of flammable fuel to air mixture. If a cylinder should relieve this would cause a serious situation. **Do not overfill containers.**

## Cylinder Markings

- Cylinders approved for use with LP-gas will have one of the following specification numbers following the DOT stamping: **4B-240, 4BA-240, 4B-300, 4BW-240, 4E-240, and ICC 26-300**. The “240” in the DOT 4B-240 designates the service working pressure of the cylinder. Only cylinders with one of these markings may be used for LP-gas.

## Cylinder Requalification

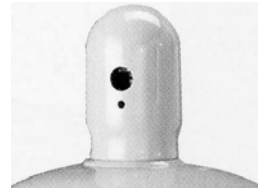
- Department of Transportation regulations require that all DOT or ICC cylinders be inspected and requalified within **12 years** of the date of manufacture and every **5 years** thereafter. This inspection is typically done by a qualified technician when your cylinder is refilled. For information about cylinder inspection and requalification consult your propane gas dealer.



- Your cylinder should also bear a decal which identifies the contents as a flammable gas by name and international I.D. number (**UN 1075**). Other cylinder warning labels available from your propane gas dealer are useful for future reference. Filling a DOT propane gas cylinder that has not been properly inspected and qualified violates federal law.

## Handling Propane Cylinders Safely

- Propane gas cylinders must be transported so the relief valve communicates with the vapor space at all times. For that reason, you should never transport a cylinder lying on its side unless it is designed for horizontal use.
- **When transporting or storing disconnected cylinders, the container outlets must be plugged, or capped.** This will keep gas from escaping and prevent foreign material from entering the cylinder should the valve be opened accidentally. Never use, store, or transport full or empty cylinders in the passenger space or living area of your vehicle, RV, or camper.

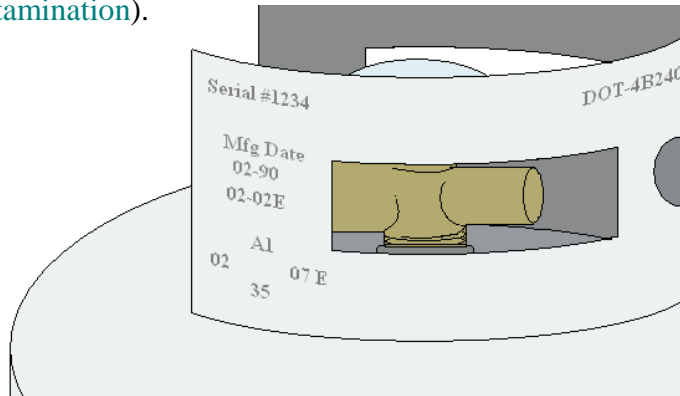


- Never store a cylinder inside a house, building, or a garage. Spare cylinders should be stored outdoors and up off the ground on a non-combustible base. Any cylinder that is damaged shows signs of corrosion, has been exposed to fire, or appears to be leaking gas should be removed from service immediately. Store defective cylinders in a safe, outdoor location. Then as soon as possible, have them repaired or disposed of by a qualified service technician.
- New cylinders must be properly *purged* of air by a qualified person prior to filling for the first time. This is because air left in the cylinder will affect how your appliance works. The presence of air can also diminish the odorant level in the container and cause excessive pressures. Once a cylinder has been properly purged of air, keep the cylinder valve closed, except when connected for use.
- DOT cylinders are filled by weight or fixed liquid level gauge to insure against overfilling. Be sure to have your cylinder filled by a qualified individual, and if filled by fixed level gauge, have the weight of the cylinder checked occasionally to assure that the tube in the fixed gauge is properly located and giving an accurate measurement. Only personnel trained in the proper filling procedures of DOT cylinders should engage in this activity.

## Visual Cylinder Inspection

All cylinders will undergo a simple visual inspection prior to being filled. This exterior inspection is performed on all bottles regardless of size or type. The bottle filler is looking for the following things:

- 1) Damage to the cylinders exterior including dents, bulges, cuts, or cracks on the container's surface or containing a weld.
  - a) **Any** damage containing a weld will be cause for failure and ***shall not be filled***.
- 2) Excessive rust or pitting on the cylinder, particularly on the bottom of the bottle.
- 3) Absence and condition of a cylinder foot ring, cylinder collar, or valve cover.
- 4) Evidence of physical abuse, fire or heat damage.
- 5) Leaks, leaking or defective valve.
- 6) The date the cylinder was manufactured or last recertified. Cylinders that are out of qualification must NOT be refilled.
  - a) All DOT cylinders must be recertified 12 years after manufacture date and every 5 years there after.
    - i) Date of Manufacture shall be indicated by a month and a year (01-04). Recertification date will be indicated in one of 2 ways: month and year followed by an "E" (05-08 E) **or** A#  
05 08E (month/year)  
## (DOT issued #)
- 7) Required cylinder markings and readability.
- 8) **OPD** valve (if required).
- 9) Discoloration of the valve (**ammonia contamination**).



If the employee dispensing is unable to fill the container because it fails the visual inspection, it is strictly for safety, regulatory compliance and in the consumers' best interest.



# Overfilling Protection Device- OPD

As of April 1, 2002, cylinders without an OPD ***cannot*** be refilled!

Beginning October 1, 1998, all newly manufactured small propane cylinders (capacity of 4 pounds up to 40 pounds) were required to be equipped with a over filling prevention device (OPD).



In most cases, consumers can tell if a propane tank has an OPD valve by the handles. If the handle is round or star-shaped (*left*) their cylinder is outdated. A triangular handle (*right*) indicates an updated **OPD** valve.



## What is an OPD?

Required by national fire and safety standards, an OPD is a safety feature that helps prevent small propane cylinders from being overfilled.

## Why have an OPD?

There are limits on how much propane can be put into a cylinder. A properly filled cylinder will have a vapor space left in the top of the cylinder to allow room for expansion of the liquid with a change in atmospheric temperature. An overfilling prevention device is a secondary means of assuring that cylinders are not overfilled.

## How can I tell if a cylinder has an OPD?

There are at least two ways to identify OPD equipped cylinders. New cylinder wrappers and/or warning labels will include this information. Second, most cylinders with an OPD have special triangular hand wheels with the letters "OPD." (However, some OPD valves were produced before the letters on the valve handles and valve bodies were required so check the wrapper or label or ask your propane supplier to identify the type of valve on your cylinder.)

## What can happen if a cylinder is overfilled?

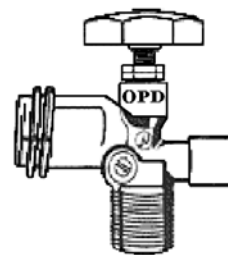
An overfilled cylinder doesn't have enough space left if the liquid expands when exposed to warmer temperatures. This can cause an increase in cylinder pressure and create potentially hazardous conditions, such as:

- The pressure relief valve may open, discharging propane from the cylinder.
- Propane liquid could enter the piping system, resulting in higher than normal pressures to appliances.

## How does an OPD work?

During the refilling process, a valve inside the cylinder closes when the proper level of propane is reached. Since the OPD currently in use measures the volume of propane in the cylinder, the weight of the propane will vary depending on its temperature. Check the posted information where you purchase propane to determine the net weight of propane in your cylinder.





### When will OPD-equipped cylinders be available?

New cylinders already have an OPD. As of October 1, 1998, all new DOT cylinders with capacities of 4 pounds up to 40 pounds must have OPD valves.

### Will my old cylinder need an OPD valve?

Yes, an OPD must be installed on your old cylinder. If your cylinder is inspected for requalification before April 1, 2002, an OPD-equipped valve will be installed at that time. (All DOT cylinders require periodic requalification to ensure that they are safe for continued use.) Even if your cylinder is not inspected for requalification before April 1, 2002, it must still have an OPD-equipped valve installed on it by that date.

The 2001 edition of **NFPA 58** modified requirements to **exempt horizontal cylinders manufactured before October 1, 1998, from requiring an OPD valve as well as cylinders used for industrial trucks (forklift), and industrial welding and cutting gases 50 lb. or cylinders more (these cylinders must be labeled with their use).**



### What happens if I don't have an OPD installed on my cylinder?

As of April 1, 2002, cylinders without an OPD cannot be refilled. It is a Federal Offense to fill a cylinder without an OPD.

**Do not use POL plugs in OPD back check valves.** Using POL plugs in this style of valve may cause a leak.



The OPD will help reduce the potential for the overfilling of propane cylinders, thus reducing the possibility of hydrostatic relief valve discharges. The OPD is the result of extensive research and testing. It is very reliable when used as a back up device to correct filling procedures. *NFPA 58* states two methods of filling proper cylinders: weight or volume measured by fixed liquid level gauge.

Use only dust covers or "QCC" caps.

**Overfilling Protection Device**  
Information on the new OPD valves from National Propane Gas Association,

## Safety Alert from National Propane Gas Association

### SAFETY ALERT

*INTRODUCTION: Readers of this bulletin should consult the law of their individual jurisdictions for codes, standards and legal requirements applicable to them. This bulletin merely suggests methods which the reader may find useful in implementing applicable codes, standards and legal requirements. This material is not intended nor should it be construed (1) to set forth procedures which are the general custom or practice in the propane industry; (2) to establish the legal standards of care owed by propane distributors to their customers; or (3) to prevent the reader from using different methods to implement applicable codes, standards or legal requirements. The National Propane Gas Association assumes no liability for reliance on the contents of this bulletin. It is offered as a guide only to assist expert and experienced teachers and managers in training in service personnel in their organizations.*

### Caution!

**The brass valve in a propane cylinder will be damaged if it comes in contact with anhydrous ammonia. This deterioration will lead to cracking of the valve body or its components and can ultimately result in a violent, unexpected expulsion of the valve from the cylinder, causing personal injury or death.**



### Background and Recommended Action

It has come to the attention of the National Propane Gas Association that propane cylinders are being used in the manufacturing of **Methamphetamines**. This drug is commonly referred to as 'crank'. Manufacturers of this illegal substance are using propane cylinders for the storage and the use of anhydrous ammonia. These cylinders have been found in many states at cylinder exchange and refilling locations as well as in hotel rooms and mobile laboratories, where the manufacturing of this illegal substance takes place.

As observed in the illustrations, a blue-green stain on any brass portion of a service valve is evidence that it may have been in contact with anhydrous ammonia\*. The pungent odor of ammonia on or near the cylinder is also an indication. If you suspect that a propane cylinder contains or has contained anhydrous ammonia, exercise extreme caution and restrict access to the area.

It can be dangerous to move the cylinder due to the unknown integrity of the cylinder's service valve. If you determine that it must be moved, keep in mind that hazards due to valve expulsion can be reduced by pointing the end of the container in which the valve is placed away from yourself and others and towards the safest direction.

Immediately contact your Fire Department, Hazardous Materials Emergency Response Unit or the nearest office of the United States Department of Justice's Drug Enforcement Administration (DEA) for information on properly disposing of the cylinder. If these respondents are not sure what to do; for assistance call **1-800-728-2482**, which is the contact number for [PERS](#), an independent hazardous materials information resource.

\*Note: Sherwood valves contain a green coated valve stem. Additionally, a green thread sealing compound is used on some valves. These valves should not be confused with those that have been exposed to anhydrous ammonia.

## **PURGING LP-GAS CONTAINERS**

***Up To 2000 Water Gallon Capacity ASME & DOT Containers*** Including Motor Fuel Containers **PURGING AND MOISTURE REMOVAL** ***All new containers*** (and in some cases used containers) may contain water, air or other contaminants, and it is essential that these be removed before filling the container and placing it into service. Water vapor present in the gas vapor may cause regulator freeze-up at the inlet orifice and interrupt the gas service. Also, it may have an effect on the ability of the odorant to meet the present standards, as water can cause oxidation (rusting) on the inside of the container and result in "odorant fade". Air in the container will cause abnormally high pressure, with the result that the pressure relief valve may open. Air in the system is also likely to cause pilot flames to go out and result in a service call. Additionally, air in the container carries moisture, which can cause service problems. If a container is suspected of being depressurized or open to the atmosphere for a period of time, it must be re-purged as if it were a new container.

### **To purge a container, the following steps should be taken:**

**Purging of containers should be performed in an approved area** (see NFPA #58). Determine if the container pressure is zero. Should the container contain only air pressure, the air may be vented directly to the atmosphere through the service valve. If free water is present in the container, it should be drained. Pressurize the container to approximately **15 PSIG with LP-gas vapor**. **Never purge with liquid LP-gas;** to do so will cause the moisture vapor to chill and remain in the container. Fully open the container service valve and vent to a safe atmosphere for a **total of five** purgings. The container is now ready to be filled with LP-gas. Once filled, all fittings and tank openings should be checked for leaks using an approved leak detector solution. The container is now ready to be placed in service.

**ALTERNATE PURGE METHOD UTILIZING A COMPRESSOR** An LP-gas compressor can be used to evacuate air in a container to about 26 "of mercury vacuum (2 PSI absolute pressure) when discharging to atmosphere. Hose suitable for vacuum service should be used and all unused valves must be closed. Protective caps on both liquid fill and vapor equalizing valves must be screwed on tightly to prevent air from entering the container when vacuum is applied. When pressure has been reduced to 26" of mercury vacuum, LP-gas vapor can be introduced until the container has reached atmospheric pressure. Add methanol as suggested and the container is then ready to be filled with liquid LP-gas.

This method effectively removes water vapor after the water is drained and reduces air in the container to about 10% of the volume at atmospheric pressure. No LP-gas is released to the atmosphere with this process. Evacuation time with a 36 CFM compressor is approximately 15 minutes per 1000 gallons of tank capacity. A 16 CFM compressor would take approximately 30 minutes per 1000 gallons of tank capacity. See NFPA-58 for more information on purging.

The purpose of this bulletin is to set forth general safety practices for the installation, operation, and maintenance of LP-gas equipment. It is not intended to be an exhaustive treatment of the subject, and should not be interpreted as precluding other procedures which would enhance safe LP-gas operations. Issuance of this bulletin is not intended to nor should it be construed as an undertaking to perform services on behalf of any party either for their protection or for the protection of third parties. The National Propane Gas Association assumes no liability for reliance on the contents of this bulletin.



# Composite Cylinders

**REQUALIFICATION TESTING** - at least every 5 years, each cylinder must be visually inspected and proof pressure tested. The retest and inspection must be performed with the outer casing in place.

- (1) *A cylinder that has been subjected to fire may not be returned to service.*
- (2) Cylinder service life **may not exceed 15 years** from the date of manufacture as marked on the cylinder.

## **MARKING -**

- (1) Each cylinder must be permanently marked as prescribed in DOT FRP-1 Standard A Basic Requirements for Fiber Reinforced Plastic (FRP) Type 3FC Composite Cylinders § 178.AA-15.
- (2) Each cylinder must be marked "DOT-SP 14562".



10-lb. Propane

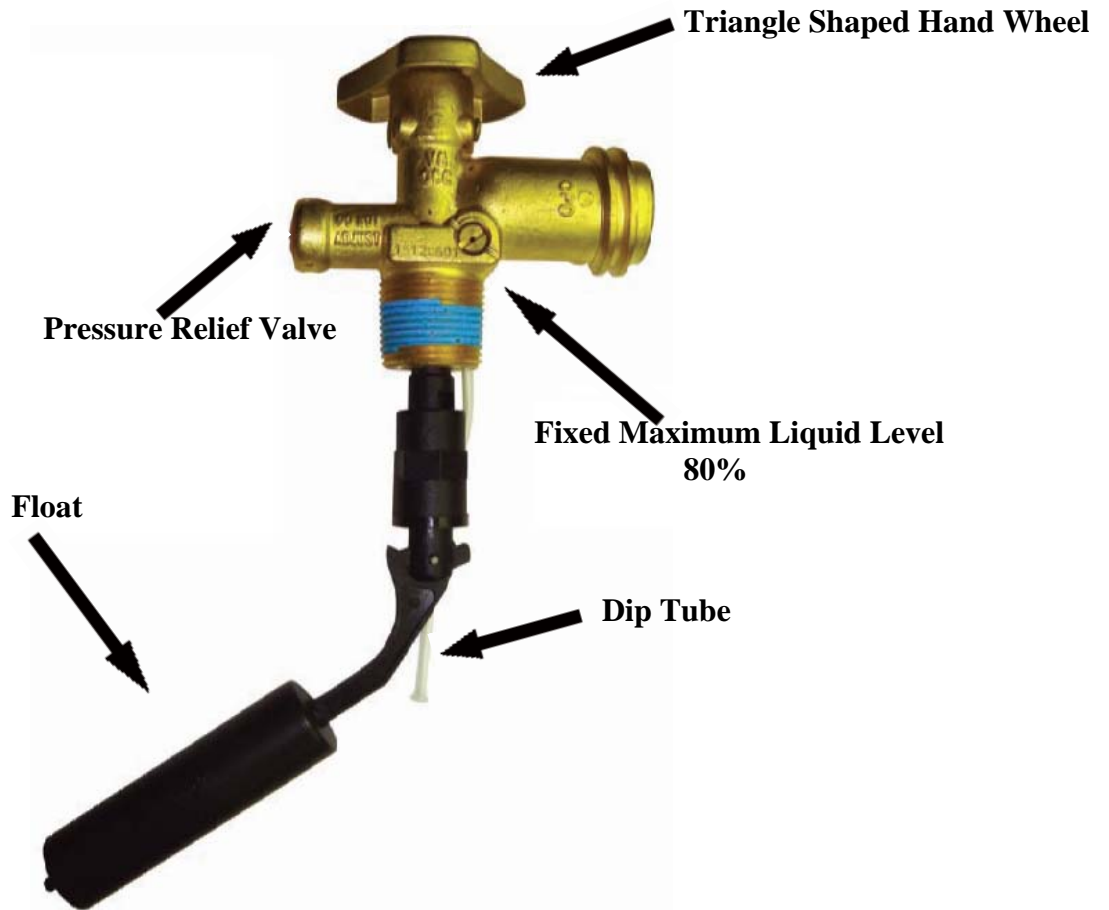


20-lb. Propane



33-lb. Forklift

## ***OPD Service Valve***



## ***Forklift Cylinder***

- 1) Filler Valve with dust cap.**
- 2) Float Gauge (do not use to fill.)**
- 3) Liquid Service Valve.**
- 4) Fixed Maximum Liquid Level Gauge. 80%**
- 5) Pressure Relief Valve w/ cap.**

